

Voices from the Coast: Grassroots Solutions for Marine Sustainability

Community-led Coastal Restoration under GEF-SGP India



A Compendium of Case Studies



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Voices from the Coast: Grassroots Solutions for Marine Sustainability

Introduction

India's coastal and marine ecosystems are among the nation's most valuable ecological and socio-economic assets. Habitats such as mangroves, seagrass meadows, coral reefs, sand dunes, and estuaries are vital for sustaining biodiversity, strengthening coastal defenses, and supporting the livelihoods of millions. Furthermore, these ecosystems act as critical buffers against climate change, mitigating the impacts of erosion, cyclones, saline intrusion, and extreme weather events.

However, mounting pressures from habitat degradation, marine pollution, destructive fishing practices, and rapid coastal development threaten both environmental health and community resilience. In many regions, this ecological decline directly exacerbates livelihood vulnerability. Reduced fish catches, the accumulation of marine debris, and overall habitat loss disproportionately affect fishing communities, women, and small-scale households that rely on these resources for food security and income. These intersecting challenges underscore the urgent need for restoration strategies that are not only ecologically sound but also socially inclusive and community driven.

Voices from the Coast: Grassroots Solutions for Marine Sustainability brings together four inspiring, community-led initiatives supported

by the Global Environment Facility Small Grants Programme (GEF-SGP) India. This booklet showcases innovative grassroots efforts led by:

- » M.S. Swaminathan Research Foundation (MSSRF)
- » Participatory Learning Action Network and Training- PLANT trust
- » Amrita Vishwa Vidyapeetham
- » Arulagam

Together, these initiatives demonstrate locally driven approaches to restoring marine habitats while simultaneously bolstering local institutions and community stewardship. The featured case studies explore diverse but deeply interconnected themes, including:

- » Ghost gear management and artificial reef deployment
- » Sand dune and seagrass restoration
- » Women-led seaweed enterprises
- » Community-based marine stewardship

While their methodologies vary, all four initiatives emphasize the critical importance of integrating traditional ecological knowledge, localized governance, and community participation into conservation. Collectively, these efforts champion biodiversity, sustainable livelihoods, women's empowerment, and climate resilience—ultimately strengthening the adaptive capacity of India's vulnerable coastal ecosystems.

M S Swaminathan Research Foundation (MSSRF)



Project Snapshot

Project Title	Minimizing the Impact of Ghost Gears to Conserve the Biodiversity of Ramanathapuram Coast through a Community-Centric Collective Approach
Implementing Organization	M.S. Swaminathan Research Foundation
Location	Ramanathapuram district in Tamil Nadu
Project Number	IND/SGP/OP7/Y3/CORE/BD/2023/01
SGP contribution in INR	3978700
Co-financing in INR	4428000

Minimizing the Impact of Ghost Gears to Conserve the Biodiversity of Ramanathapuram Coast through a Community-Centric Collective Approach in Tamil Nadu

Project Description

Relevance of the project: The project is highly relevant as it addresses the growing threat of ghost gears to marine biodiversity while promoting sustainable fishing practices. By integrating conservation with livelihood enhancement through women-led recycling initiatives, it safeguards coastal ecosystems, empowers communities, and supports long-term environmental and socio-economic resilience in Ramanathapuram district.

Impacts: The project restored 0.54 km² of seawater and cleaned 141.8 hectares of coastal terrain, significantly improving marine habitat health and reducing ghost gear pollution. Socio-economically, 1,158 households—mainly fishers and SHG members—benefited through awareness, cleanup, and upcycling initiatives, enhancing livelihoods, gender inclusion, and community commitment to sustainable marine resource management.

Lessons Learned for Project Replication and Up-scaling: The project highlights that flexible scheduling, proactive coordination with authorities, and community-driven participation are crucial for success. Integrating gender-inclusive training, adaptive planning to weather conditions, and awareness campaigns fostered strong local ownership—demonstrating that replication and upscaling are feasible when ecological restoration aligns with livelihood enhancement and institutional collaboration.



Background

The coastal and island regions of Ramanathapuram district hosted diverse marine ecosystems that supported several threatened species. However, these habitats were increasingly endangered by ghost gears—abandoned or lost fishing nets that continued to trap marine life and damage habitats. To address this challenge, the M.S. Swaminathan Research Foundation launched a community-based initiative focusing on ghost gear retrieval, recycling, and awareness generation. Through participatory research, fisher training, and gender-inclusive livelihood promotion, the project aimed to reduce marine pollution, restore biodiversity, and build local stewardship. It also developed voluntary codes of practice to encourage sustainable fishing and long-term marine conservation.

Implementation

The project on ghost gear management was implemented through an integrated, community-driven approach combining scientific assessment, capacity building, and practical interventions. Ghost gear hotspots were mapped using field surveys, fisher inputs, and GPS-based geo-mapping. Awareness and training sessions educated fishers on responsible gear practices and empowered women through upcycling and entrepreneurship training. Retrieval operations were carried out along shorelines, islands, and

underwater zones with strict safety protocols and coordination with the Forest Department. By integrating environmental restoration with livelihood generation, the project effectively promoted marine conservation, gender-inclusive participation, and sustainable coastal management, ensuring long-term ecological and socio-economic resilience.

Application of Indigenous Knowledge

The project leveraged the traditional knowledge of local fishers and coastal communities to identify ghost gear accumulation hotspots and disseminate sustainable practices. Their firsthand experience guided mapping, retrieval, and prevention strategies, ensuring culturally appropriate interventions while integrating community wisdom with scientific tools for



effective marine conservation and livelihood enhancement.

Environmental Impact

The project led to substantial ecological restoration across both marine and coastal zones. Approximately 0.54 km² of seawater showed marked improvement, with clearer waters, reduced ghost gear debris, and signs of habitat recovery in key marine areas. Additionally, 141.8 hectares (1.418 km²) of coastal and island terrain were effectively cleaned, demonstrating the significant scale and impact of community-led interventions in mitigating marine litter and protecting biodiversity.

Socioeconomic Impact

The project generated significant socioeconomic benefits by directly engaging 1,158 households, including fisher families, SHG members, and youth, in community-led clean-up drives, awareness sessions, and upcycling workshops. It enhanced livelihood opportunities, environmental awareness, and community participation. Around 100 women and girls received hands-on training in repurposing ghost gear into eco-friendly products, gaining income-generating skills and confidence. Furthermore, 10 women entrepreneurs emerged, transforming marine waste into marketable goods with SHG and expert support. These initiatives fostered financial independence, promoted circular economy practices, and

strengthened gender-inclusive development, making coastal communities more resilient and environmentally conscious while improving long-term livelihood sustainability.

Gender Mainstreaming

The project successfully advanced gender mainstreaming by actively involving women in marine conservation and livelihood activities. Women participated in shoreline clean-ups, upcycling training, and product innovation, breaking traditional gender roles. Through SHG-led enterprises, they gained leadership, entrepreneurship, and financial independence. This inclusive approach empowered women as key agents of environmental stewardship, strengthened community resilience, and demonstrated the transformative impact of integrating gender perspectives into sustainability initiatives.



Policy Impact

The project activities are directly aligned with several programs of the Government of India (GOI) and the state, such as Clean Seas campaign, Swatch Bharat Mission, Tamil Nadu- Coastal Restoration Mission.

Impact at a Glance

Area of marine habitats under improved practices (Ha): 300

No. of Direct project beneficiaries: 850

Sustainability

MSSRF has established partnerships with several institutions and organizations, including CMFRI, GOMBRT, the Fisheries Department, Panchayats, NCCR, the Tourism Department, Traditional

Panchayats, boat owners, women's groups and youth associations, and the HCL Foundation. The following are the partnerships, institutions, and organizations.

S. No	Institute involved	Role
1	Central Marine Fisheries Research Institute (CMFRI)	Training and Capacity Building
2	Gulf of Mannar Biosphere Reserve Trust (GOMBRT)	Clean up action on the island
3	Fisheries department	Training and capacity building, advocacy, voluntary guidelines development, and expansion of the upcycling programme with more women's groups
4	Panchayat	Clean up action on the shore
5	NCCR	Resource person in the training
6	Tourism department	Develop a comprehensive plan for the debris-free green Rameswaram
7	Traditional panchayat	Clean up drives and retrieval of ghost gears
8	Boat owners	Collection and retrieval of ghost gears from the sea, supporting all the field-level actions
9	Women's groups and youth associations.	Actively involved in all retrieval actions
10	HCL Foundation	Funding Expanding the work in other clusters

Before



After



Contribution to SDGs

The ghost gear upcycling project contributes to multiple Sustainable Development Goals (SDGs) by integrating social, economic, and environmental benefits. By providing alternative livelihoods to fisherwomen through recycling and upcycling of ghost gear, the project contributes to economic empowerment and poverty alleviation (SDG 1) and promotes gender equality through women's active participation in training and economic activities (SDG 5). It fosters sustainable economic growth, entrepreneurship, and skill development for coastal communities (SDG 8) while encouraging responsible consumption and circular economy practices by transforming waste into value-added products (SDG 12). By mitigating marine pollution and restoring ecosystems, the project indirectly enhances climate resilience and adaptation of coastal livelihoods (SDG 13). Its direct focus on reducing ghost gear, conserving marine habitats,



and protecting threatened species contributes to marine biodiversity conservation (SDG 14), and shoreline clean-ups and habitat rehabilitation strengthen coastal terrestrial biodiversity and ecosystem health (SDG 15). Overall, the project exemplifies a holistic approach where environmental sustainability, community empowerment, and economic development are mutually reinforced.

Replication & Up-scaling

The Fisheries Department in the district showed keen interest in adopting aspects of the project model, particularly the ghost gear retrieval and upcycling initiatives. They initiated discussions to explore how these practices could be integrated into ongoing coastal management and fisher welfare programs, reflecting the model's potential to address marine pollution while promoting sustainable livelihoods, especially for women and youth in coastal communities.

Challenges Faced & Lessons Learned

The project faced challenges such as limited fisher availability, procedural delays for island access, and adverse marine conditions. Flexible scheduling, proactive coordination, and strict safety measures helped overcome these barriers. Lessons learned emphasized the importance of adaptive planning, gender-inclusive participation, and multi-stakeholder collaboration for sustainable, community-driven marine conservation.



Participatory Learning Action Network & Training Trust



Project Snapshot	
Project Title	Reef for fish for Ever Fabrication and Deployment of Artificial Reef to enhance the marine fisheries resources and conserve the coastal biodiversity at Rameshwaram fishing villages in Ramanathapuram District
Implementing Organization	Participatory Learning Action Network & Training Trust
Location	Gulf of Mannar region in Ramanathapuram district in Tamil Nadu
Project Number	IND/SGP/OP7/Y3/CORE/BD/2023/04
SGP contribution in INR	4066425
Co-financing in INR	1515825

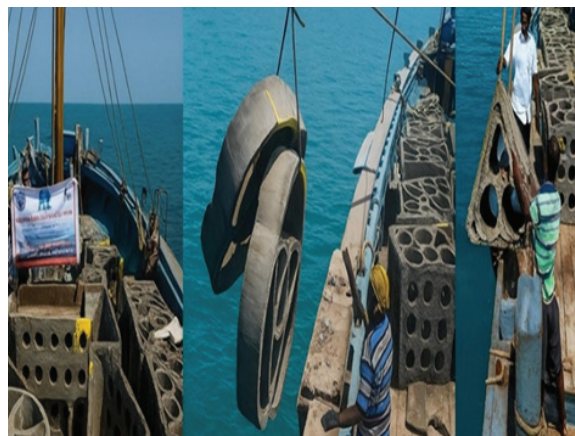
Reef for fish for Ever: Fabrication and Deployment of Artificial Reef to enhance the marine fisheries resources and conserve the coastal biodiversity at Rameshwaram fishing villages in Ramanathapuram District, Tamil Nadu

Project Description

Relevance of the project: The project was highly relevant as it addressed declining fish stocks, coral reef degradation, and livelihood vulnerabilities in the Gulf of Mannar. By integrating indigenous knowledge with scientific reef restoration, it enhanced marine biodiversity, promoted sustainable fisheries, and empowered coastal communities—especially women—through participatory, gender-inclusive conservation and livelihood diversification

Impacts: The artificial reef project enhanced marine biodiversity over 1,500 sq. m, sequestering 1,098–3,000 kg CO₂ annually and reducing 13.25 kg CO₂ emissions per boat daily. Fish catches rose to 3,000–5,000 kg monthly, benefiting 5,000 families. Women-led fish marketing and youth-led reef monitoring generated ₹15 lakh monthly income, strengthening ecological health and community resilience.

Lessons Learned for Project Replication and Up-scaling: Lessons from the project highlight the value of community ownership, gender-inclusive participation, and integration of traditional knowledge for successful replication. Establishing local management committees, providing technical training, and creating revolving funds ensured sustainability. Strong institutional coordination and stakeholder partnerships proved essential for scaling up artificial reef initiatives across coastal regions.



Background

The Gulf of Mannar, along the Rameshwaram coast in Ramanathapuram District, was a globally significant marine ecosystem, enriched with coral reefs, seagrasses, mangroves, estuaries, rocky shores, and sandy beaches. Home to over 4,200 species of flora and fauna, it has been recognized for its biodiversity since the UNESCO Man and Biosphere (MAB) program in 1971.

Despite its ecological richness, the region faced severe threats from overfishing, destructive fishing practices, coral reef degradation, and loss of habitat. These pressures led to declining fish stocks, reduced biodiversity, and diminished livelihoods for local fisherfolk, particularly women who were often engaged in post-harvest activities. Additionally, limited awareness of sustainable fishing practices and the lack of community-managed marine conservation initiatives exacerbated environmental and socioeconomic vulnerabilities. The Reef for Fish project addressed these challenges by deploying 300 artificial reefs across key fishing villages, enhancing fishery resources, preserving endangered species, and promoting gender-inclusive, community-led coastal conservation.

Implementation

The Reef for Fish project adopted a participatory, community-driven approach. It began with stakeholder consultations,

mapping fisherfolk, women, youth, and indigenous groups to ensure inclusive engagement. Beneficiaries were trained in artificial reef fabrication and deployment, combining traditional knowledge with technical guidance. Women actively participated in reef construction and fish marketing, while management committees oversaw reef maintenance and equitable fund utilization. Three reef clusters were established across key villages, supported by IEC campaigns, community workshops, folk media, and digital awareness tools. Continuous monitoring, capacity building, and knowledge documentation ensured sustainability, increased fish biomass, and promoted responsible fishing practices.

Application of Indigenous Knowledge

Fisher folk have vast traditional knowledge, identifying ocean depths, seasonal changes, and ocean currents mixed with flora and fauna, known as the “biological soup.” They predict fish locations by observing seawater colour and prepare crafts and gear accordingly. The project utilized their expertise to identify shallow depths for artificial reef deployment. A survey on June 12, 2024, assessed nine stations, selecting three optimal sites with fishermen’s support. This collaboration emphasizes the value of integrating traditional knowledge with scientific approaches for marine conservation.



Environmental Impact

The artificial reef project has significantly contributed to marine biodiversity, carbon sequestration, and sustainable fishing practices. Covering an area of 1,500 square meters, the artificial reef served as a buffer zone where fish species migrate, settle, and breed, leading to increased fish populations. Beyond fisheries,

artificial reefs played a crucial role in carbon sequestration. A single artificial reef structure absorbs between 3.66 to 10 kg of CO₂, per year. With the planting of 300 reefs, annual CO₂ sequestration ranges from 1,098 to 3,000 kg, contributing to climate change mitigation. The reefs also offer economic advantages by reducing fishing time and fuel consumption. Since fishing grounds are within a 5 km radius, fishers saved an estimated 5 liters of fossil fuel per boat daily.

This resulted in a CO₂ emission reduction of approximately 13.25 kg per boat per day. These combined benefits showcased how artificial reefs supported sustainable fisheries, reduced environmental impact, and created long-term economic gains for local fishing communities while ensuring marine conservation. The reefs also control the sea erosion by way of controlling the seismic activity.



Socioeconomic Impact

The artificial reef deployment greatly increased fishery resources, with fishermen reporting 3,000–5,000 kg of catch per month after a one-

year maturation period. Over 5,000 families in Rameshwaram benefited through more stable and sustainable livelihoods. Youth played a major role, using their hook-and-line fishing skills to efficiently harvest high-value species in reef zones, ensuring quality catches with less time at sea. Many also supported reef monitoring and conservation, strengthening long-term sustainability. Women contributed by removing middlemen in fish sales; they led auctioning, vending, and exporting to nearby cities, securing fair prices for the community. Across three reef zones, fishing increased to 50 tons per month, generating Rs. 1500000 in monthly income for 1,200 families. Each family now earned Rs. 12,500–15,000 per month, improving financial security. Overall, the initiative enhanced livelihoods, empowered women, engaged youth in sustainable fishing, improved access to education and healthcare, and strengthened community resilience.



Gender Mainstreaming

The project actively empowered women by involving them in artificial reef fabrication, fish marketing, and reef management committees. Women now lead decision-making on sustainable fishing practices, regulate reef conservation, and manage community funds, strengthening household incomes. Their participation fostered social equity, built technical skills, and enhanced leadership. By integrating women in all aspects of reef management, the project ensured gender-

Policy Impact

The project's success influenced state-level fisheries policy, leading to the Tamil Nadu government's adoption of participatory artificial reef models. It catalyzed replication across districts through government, CSR, and international collaborations, institutionalizing community-led reef management and demonstrating effective policy integration of sustainable fisheries and coastal ecosystem restoration practices.

Impact at a Glance

Area of marine habitats under improved practices (Ha): 316

Beneficiaries (total): 3900 households

No. of Direct project beneficiaries (No.): 600

inclusive, sustainable fisheries, promoting both ecological conservation and economic resilience in coastal communities.

Sustainability

The artificial reef project united multiple stakeholders to address fisheries, marine conservation, and livelihood challenges in a transboundary coastal zone. Because the site lay near shared marine waters, PLANT engaged the Navy, Coast Guard, Marine Police, Wildlife, Forest, and Fisheries Departments from the start, securing permissions and

ensuring smooth, conflict-free deployment. Government agencies, especially the Tamil Nadu Fisheries Department, provided policy support, funding, and standardized practices, while local administrations coordinated field activities. CSR partners offered co-financing and logistics, and research institutions guided impact assessments, monitoring, and reef design. Fisher cooperatives and self-help groups led fabrication, deployment, and fisheries management, strengthening biodiversity, fish stocks, and community resilience.

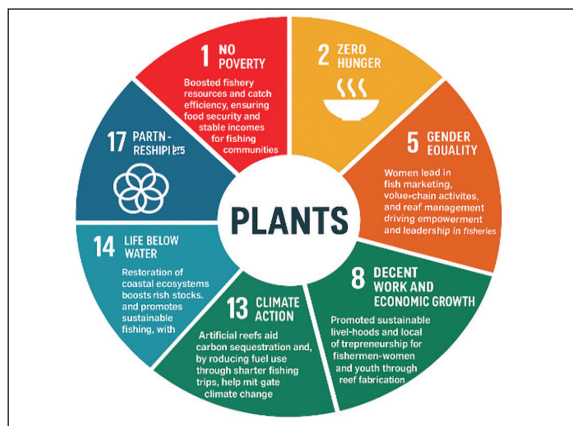
S. No	Institute involved	Role
1	Navy	Provided permissions and coordination for operations near transboundary waters; ensured security and compliance.
2	Coast Guard	Monitored maritime safety and assisted in deployment logistics
3	Marine Police	Facilitated local maritime enforcement and safety during reef deployment
4	Wildlife Department	Advised on biodiversity conservation, habitat protection, and environmental compliance.
5	Forest Department	Provided guidance on ecological conservation and ecosystem protection
6	Fisheries Department (Tamil Nadu State)	Policy support, funding facilitation, standardization of reef deployment practices, and regulatory oversight.
7	Local Administration / Panchayats	Facilitated on-ground coordination, logistics, and community engagement.
8	Private Sector / CSR Partners	Provided co-financing, logistical support, and resources for large-scale reef fabrication and deployment
9	Research Institutions & Academia	Conducted environmental impact assessments, biodiversity monitoring, and optimized reef designs
10	Community Networks (Fisher Cooperatives, SHGs)	Assisted in reef fabrication, deployment, and ongoing fisheries management; ensured community ownership

Contribution to SDGs

The artificial reef project advanced multiple Sustainable Development Goals. SDG 1 and 2 were addressed by enhancing fishery resources, improving catch efficiency, and ensuring food security and stable incomes for fishing communities. SDG 5 was promoted through women's active participation in marketing, reef management, and decision-making, fostering economic empowerment and leadership. SDG 8 was supported via sustainable livelihood opportunities and local entrepreneurship in reef fabrication and seafood value chains. SDG 13 benefits from reduced fuel use and carbon sequestration. SDG 14 was reinforced through ecosystem restoration and sustainable fisheries, while SDG 17 was highlighted through multi-stakeholder partnerships enabled by GEF SGP support.

Replication & Up-scaling

The project's success led the Tamil Nadu government to approve more artificial reef projects at Rameshwaram in Ramanathapuram District. Recognizing its impact, the Tamil Nadu Fisheries Department standardized the participatory fabrication and deployment model for wider replication. It also attracted corporate CSR support, with the Madras Atomic Power Station replicating the initiative in 17 villages, deploying over 5,000 structures in Mahabalipuram and Kalpakkam through PLANT Trust. Additionally, the Australian Consulate

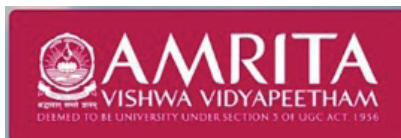


General in Chennai co-financed 100 artificial reef structures for Kasimedu fishermen, furthering efforts initiated under the OP 5 GEF SGP project to enhance fisheries and coastal conservation.

Challenges Faced & Lessons Learned

The project overcame challenges such as coordinating diverse stakeholders, ensuring equitable participation of women, youth, and indigenous communities, and addressing overfishing pressures in reef areas. Technical difficulties in artificial reef fabrication and deployment also emerged. Lessons learned include the importance of inclusive community engagement, gender-sensitive approaches, capacity building, and knowledge sharing. Strengthening local management committees and establishing revolving funds proved effective in sustaining reef conservation, enhancing fishery resources, and promoting long-term ecological and socio-economic resilience.

Amrita Vishwa Vidyapeetham



Project Snapshot

Project Title	Blue is the New Pink: Women Driving Sustainable Seaweed Cultivation and Climate Solutions
Implementing Organization	Amrita Vishwa Vidyapeetham
Location	Ramanathapuram District in Tamil Nadu
SGP contribution in INR	39,33,192
Co-financing in INR	1,03,78,380

Blue is the New Pink: Women Driving Sustainable Seaweed Cultivation and Climate Solutions

Project Description

Relevance of the project: The project addressed ecological degradation and livelihood insecurity in Ramanathapuram's coastal communities by restoring seagrass meadows and promoting sustainable seaweed cultivation. By integrating women's indigenous knowledge with scientific practices, it enhanced marine biodiversity, strengthened climate-resilient livelihoods, and fostered inclusive, community-led coastal ecosystem management and sustainable development.



Impacts: The project restored and conserved 107 hectares of marine ecosystems, including seaweed farms, IMTA areas, and seagrass meadows. It directly benefited 102 households, indirectly reached 500 households. Over 2,000 community members gained skills, awareness, and social empowerment, with strong inclusion of SC and MBC groups.

Lessons Learned for Project Replication and Up-scaling: The project encountered environmental, social, and operational challenges, including seed loss, theft, gender barriers, and profit-sharing issues. These were overcome through technical adaptations, community ownership, training, and stakeholder engagement. Key lessons highlight the importance of resilience, women's empowerment, collaborative problem-solving, and adaptive management for replicating and scaling sustainable coastal livelihoods.

Background

The coastal ecosystems of Ramanathapuram District, Tamil Nadu, were under increasing pressure due to marine biodiversity loss, degradation of seagrass meadows, pollution, and declining livelihood opportunities for coastal communities—particularly women. Overfishing, unsustainable resource use, climate variability, and limited access to alternative income sources had weakened traditional fisheries-based livelihoods and disrupted long-standing human–ocean relationships. Women, despite their central role in household and community resilience, had historically faced social, cultural, and institutional barriers that restricted their participation in marine-based livelihoods. At the same time, ecologically valuable habitats such as seagrass meadows, which supported fisheries, shoreline protection, and blue carbon sequestration, were increasingly threatened.

In this context, nature-based solutions that integrated ecosystem restoration with inclusive livelihood development were urgently needed. Sustainable seaweed cultivation and integrated aquaculture offered a climate-resilient pathway to restore marine ecosystems while generating alternative income opportunities. This project emerged from this need, positioning women as key agents of ecological restoration, livelihood diversification, and sustainable coastal development.

Implementation

The project was implemented through a phased, community-centred approach integrating ecological assessment, capacity building, and livelihood development. Baseline biodiversity surveys and seagrass mapping were conducted through field visits, boat surveys, and community consultations to assess habitat conditions and species diversity. Women were



then mobilised and trained using participatory, module-based programmes covering seaweed cultivation, IMTA, business development, life skills, and digital literacy. Scientific site selection, continuous technical supervision, and clear SOPs ensured safe and sustainable cultivation practices. Parallel awareness programmes, ICT-enabled learning, seagrass restoration, and coastal clean-up activities strengthened environmental stewardship. Women-led processing and value addition transformed seaweed into marketable products, embedding sustainability, ownership, and long-term livelihood resilience within coastal communities.

Application of Indigenous Knowledge

Indigenous knowledge played a critical role in guiding site selection, seasonal planning, species identification, and sustainable harvesting practices. Local women's experiential understanding of tides, currents, and marine ecosystems enhanced scientific interventions, ensured cultural acceptance, reduced ecological risks, and strengthened long-term sustainability of seaweed cultivation and coastal restoration efforts.

Although seaweed has long been cultivated in the region, it was not traditionally part of local diets. Women innovated seaweed-based recipes, preparing pickles, pakoras, cutlets, and other familiar foods. They introduced seaweed

into daily meals, improving household nutrition while building local market acceptance.

Environmental Impact

The project improved marine ecosystems across approximately 92.46 hectares, including 3.98 hectares of seaweed farms, 0.16 hectares under IMTA (Integrated Multi-tropic Aquaculture), and 2.78 hectares of active seagrass restoration. Additionally, 85.54 hectares of seagrass meadows were conserved through community awareness and stewardship initiatives.



Socioeconomic Impact

The project directly benefited 102 households across five villages and indirectly reached around 500 households through awareness programmes. A total of 102 women received livelihood training in seaweed cultivation and IMTA, while 2,000+ community members—



including women, men, and children—gained skills, awareness, and social empowerment, with strong inclusion of SC and MBC communities.

Amrita's training programme enabled over 100 women to access meaningful livelihood opportunities. Beyond cultivation, women were trained in entrepreneurship, digital and financial literacy, enabling them to move from selling raw harvest into value addition, branding, and market engagement—reducing dependence on industry-controlled value chains where raw seaweed earns minimal returns. This led to the creation of two women-led brands, allowing women to retain value at the grassroots through both raw harvest sales and value-added seaweed products.

Gender Mainstreaming

The project successfully mainstreamed gender by placing women at the centre of marine livelihood and conservation activities. Women transitioned from restricted access to

leadership roles as cultivators, entrepreneurs, and environmental stewards, gaining confidence, income, decision-making power, and recognition while transforming social norms within coastal communities.



Policy Impact

The project aligned with government initiatives, including the Seaweed Park, PMMSY, Swachh Bharat Mission, and NRLM, promoting sustainable fisheries, coastal conservation, and women's empowerment. Collaboration with MSME and NIESBUD supported training, financial aid, and entrepreneurship, enhancing ecosystem health, livelihood opportunities, and a scalable model for sustainable, women-led coastal development.

Impact at a Glance

Beneficiaries (total): 2000

Beneficiaries (female): 1800

Marine Habitat Improvement: 107 hectares

Sea grass restoration: 2.8 hectares

Amrita Vishwa Vidyapeetham Received Best Innovation Awards Award at the World Sustainable Development Summit (WSDS 2026)

Ms. Tanvi Garg, Joint Secretary & GEF-OFP, MoEF&CC, GoI, and Ms. Leena Nandan, Distinguished Fellow, TERI presented the Best Innovation Awards to recognizing outstanding product and process innovations.

Amrita Vishwa Vidyapeetham was honoured for its scalable, women-led seaweed cultivation initiative that strengthened coastal livelihoods, enhanced income security for women's collectives, and promoted marine biodiversity conservation. The model demonstrated how science-based innovation, community participation, and women's leadership can converge to create resilient blue economy pathways with strong potential for replication across coastal landscapes.



Sustainability

The project's sustainability was strengthened through partnerships with seven institutions, including the Department of Fisheries, CMFRI, CSIR-CSMCR, Alagappa University, and RK Algae Project Centre. These collaborations provided technical expertise, policy alignment, training support, and scientific validation, enabling the effective implementation, knowledge exchange, and a strong potential for replication and upscaling.

Contribution to SDGs

The project contributed to multiple Sustainable Development Goals (SDGs) by integrating women-led livelihoods with ecosystem restoration. It advanced SDG 1 and SDG 8



through income generation and climate-resilient employment, SDG 2 through improved nutrition, and SDG 5 by strengthening women's leadership. Environmental actions supported SDG 6, SDG 12, SDG 13, SDG 14, SDG 15, and

S. No	Institute involved	Role
1	Department of Fisheries, Ramanathapuram	Community-level implementation support
2	CSM-CSRI, Mandapam	Explore seaweed value-added products opportunities
3	CMFRI, Mandapam	Explore seaweed cultivation training methods
4	Department of Oceanography and Coastal Area Studies - Alagappa University, Thondi	Explore sites for Dugong / Mussel / Oyster availability in the region
5	Department of Fisheries, Kollam	Explore on Mussel cultivation techniques in Kerala - for IMTA implementation
6	RK Algae Project Centre in Mandapam	Understand different algae and their availability in different coasts

SDG 17 by improving water quality, promoting responsible production, enhancing blue carbon, restoring marine biodiversity, and reducing land-based pollution.

Replication & Up-scaling

The project has not yet been replicated or scaled up in the district or in neighboring districts, and no other institutions or agencies are currently adopting this project model.

Challenges Faced & Lessons Learned

The project faced environmental, social, and operational challenges, including seed loss,

post-harvest theft, gender barriers, limited services, and profit-sharing disputes. These were addressed through technical adjustments, community ownership, training, stakeholder engagement, and transparent processes. Lessons learned emphasize resilience, women's empowerment, collaborative problem-solving, and adaptive management for sustainable coastal livelihoods.



Arulagam



Project Snapshot

Project Title	A Sustainable Approach to Sand Dune Restoration for Nature and People in Rameswaram Island, Ramanathapuram, Tamil Nadu
Implementing Organization	Arulagam
Location	Ramanathapuram District, Tamil Nadu
Project Number	IND/SGP/OP7/Y4/CORE/BD/2023/17
SGP contribution in INR	4000000
Co-financing in INR	1620200

A Sustainable Approach to Sand Dune Restoration for Nature and People in Rameswaram Island, Ramanathapuram, Tamil Nadu

Project Description

Relevance of the project: The project was highly relevant as it addressed coastal degradation and climate vulnerability on Rameswaram Island. By restoring sand dune ecosystems using native species and community participation, it enhances biodiversity, safeguards livelihoods, and strengthens natural coastal defenses—aligning ecological restoration with climate resilience and sustainable development priorities of Tamil Nadu’s coastal regions.



Impacts: The project restored 52 hectares of sand dunes and improved land management across 20 hectares, enhancing coastal resilience and biodiversity. It directly benefited 26 households and indirectly supported more than 4,000 households, including 407 women, through better ecosystem services, awareness, and sustainable livelihood opportunities, fostering both environmental and social well-being.

Lessons Learned for Project Replication and Up-scaling: The project demonstrated that community participation, adaptive management, and integration of traditional knowledge were key to successful ecosystem restoration. By overcoming challenges such as grazing and weather extremes through local solutions and continuous monitoring, it highlighted the importance of flexibility and collaboration, providing a strong model for replication and large-scale coastal restoration initiatives.

Background

Arulagam, a Coimbatore-based nature conservation NGO, is leading a transformative sand dune restoration initiative on Rameswaram Island, Tamil Nadu, with support from UNDP, GEF, SGP, and TERI. The project aims to revive 50 hectares of fragile coastal dune ecosystems by planting native species that enhance biodiversity, stabilize the coastline, and build climate resilience. Central to this effort is the “Neythal” nursery at Mugammathiyaar Puram, which has produced over 70,000 saplings with strong community participation. By blending traditional ecological knowledge with scientific restoration, the project fosters environmental stewardship and sustainable livelihoods for the island’s coastal communities.

Implementation

The implementation process of the Sand Dune Restoration for Nature and People project on Rameswaram Island followed a community-driven, science-based approach integrating ecological assessment and local participation. Beginning with pilot studies and spatial mapping using GIS and drone imagery, the team identified priority restoration zones and key threats. Through stakeholder surveys, focus group discussions, and participatory field assessments, valuable local and traditional ecological knowledge was gathered. Training sessions, awareness campaigns, and

workshops empowered diverse groups—including fisherfolk, women, youth, and local institutions—to actively engage in restoration and protection efforts. The establishment of the Neythal nursery, which raised over 70,000 native dune species, anchored on-ground restoration across 18 hectares. Community-led “Sand Dune Saviours Committees” now ensure long-term monitoring and sustainability. This inclusive and systematic process effectively combined science, tradition, and social stewardship to restore fragile coastal ecosystems while strengthening local resilience.

Application of Indigenous Knowledge

The project skilfully integrated Indigenous and traditional ecological knowledge in sand dune restoration. Local communities shared time-tested insights on native species selection, seasonal cycles, and planting techniques suited



to coastal conditions. This wisdom guided site identification, seed collection, and plantation timing, ensuring ecological harmony and sustainability. By valuing community knowledge, the initiative successfully bridged tradition and science for resilient coastal ecosystem restoration in Rameswaram.

Environmental Impact

A total of 52 hectares of sand dune areas were restored, while an additional 20 hectares of land were brought under improved land-use and management practices, enhancing ecosystem stability and coastal resilience.

Socioeconomic Impact

About 26 households comprising 105 individuals directly benefited from the project, while more than 4,000 households and 407 women gained indirect benefits through improved ecosystem services, awareness, and livelihood opportunities.



Gender Mainstreaming

Women played a pivotal role in the sand dune restoration project, driven by their close connection to water management and household sustainability. Their understanding of how healthy sand dunes support groundwater recharge made them active participants rather than passive beneficiaries. Bringing valuable ecological knowledge and lived experiences, women contributed to planning, discussions, and restoration efforts. Their engagement not

Policy Impact

The project was closely aligned with key state and national policies promoting climate resilience and ecological sustainability. By complementing the Tamil Nadu Climate Smart Villages Initiative and contributing to the vision of a future Sand Dune Safeguarding Programme, it demonstrated how community-led restoration enhances natural coastal protection, biodiversity, and water conservation—offering a scalable model for integrating ecosystem restoration into climate-smart policy frameworks.

Impact at a Glance

Area of land restored (Ha): 52

Beneficiaries (total): 4026 households

only strengthened the project's community base but also empowered them as stewards of local environmental resilience—bridging household well-being with ecosystem conservation for a sustainable future.

Sustainability

The project's success was built on strong partnerships with 11 dedicated institutions and organizations that brought together scientific expertise, grassroots experience, and community engagement. From data support

by MSSRF to awareness creation by Kadalosai FM, and active participation from NGOs like SPEED, Green Rameswaram, TRRM, PAD, and Vanam Foundation, each partner played a vital role. Schools, eco-development committees, and local foundations strengthened on-ground actions through clean-up drives, nursery development, and plantation efforts. This collaborative network exemplified how collective effort and shared vision can restore ecosystems while empowering communities toward sustainable coastal conservation.

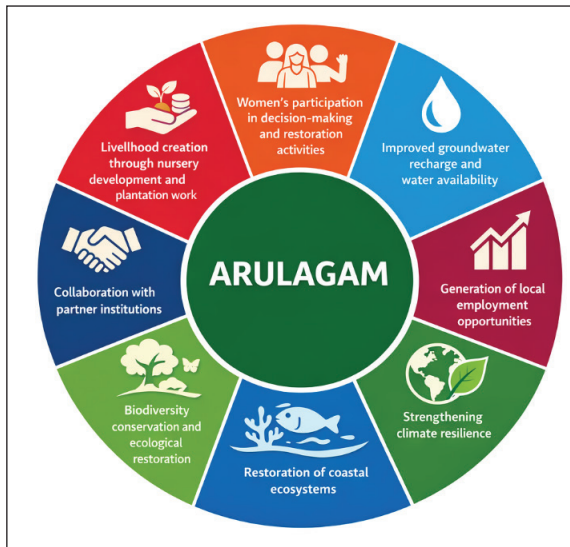
S. No	Institute involved	Role
1	MSSRF, Rameshwaram	MSSRF supported sand dune restoration by providing baseline data, guiding planning and implementation, promoting community awareness through coastal clean-up drives, and actively participating in plantation activities with local communities.
2	SPEED (NGO)	SPEED contributed valuable insights during the planning and review phases, shaping the strategic direction of the project.
3	Green Rameswaram (NGO)	They offered valuable insights during stakeholder meetings to guide planning and implementation and actively participated in plantation activities alongside local communities.
4	Thodakkam (NGO)	They provided valuable insights during the planning and review phases, contributing to the project's strategic direction.
5	KSIR School, Coimbatore	They actively participated in mangrove afforestation and coastal clean-up drives.
6	TRRM, Pamban (NGO)	They offered valuable insights during stakeholder meetings to guide planning and implementation and actively participated in plantation activities alongside local communities.

S. No	Institute involved	Role
7	PAD, Thangachimadam (NGO)	They offered valuable insights during stakeholder meetings to guide planning and implementation and actively participated in plantation activities with local communities.
8	Eco Development Committee, Kunthukkal	They actively participated in clean-up drives, plantations, and training, while providing key insights for planning and implementation.
9	Vanam Foundation, Thiruvapur (NGO)	Provided technical support and actively participated in mangrove plantation activities, contributing to the project's successful restoration efforts.
10	Aaranya Forest and Sanctuary	Provided hands-on training and exposure visits on nursery development, offering continuous support in sand dune plantation techniques.
11	Kadalosai FM, Rameshwaram	They provided valuable insights during project planning and execution and played a crucial role in raising awareness on sand dune conservation through radio broadcasts and social media outreach.
12	Hindu Religious and Charitable Endowments (HR&CE)	Provided permission and facilitated conservation activities to Arulagam on coastal temple lands
13	Rameshwaram Municipality	The Municipality facilitated site access and permissions, supported community awareness, prevented encroachment and dumping, and coordinated with local stakeholders for sand dune restoration.

Contribution to SDGs

This project significantly advanced multiple Sustainable Development Goals (SDGs) through ecological restoration and community empowerment. It contributed to SDG 1 and SDG 8 by creating local livelihoods through nursery development and plantation work. SDG 5 was achieved by mainstreaming women's

participation in decision-making and restoration activities. The project enhanced SDG 6 by improving groundwater recharge and water availability. It promoted SDG 13, SDG 14, and SDG 15 by restoring coastal ecosystems, strengthening climate resilience, and conserving biodiversity. Through collaboration with



11 partner institutions, it exemplified SDG 17—strong partnerships for sustainable development.

Replication & Up-scaling

The project has inspired interest from the Tamil Nadu Forest Department, Ramanathapuram, and the World Resources Institute to adopt its model for wider implementation. While replication by women's groups is expected post-project completion, these initiatives will be documented and shared on the SGP Learning Forum to promote knowledge exchange and scaling.



Challenges Faced & Lessons Learned

The project faced challenges such as sapling damage from grazing, heavy rains, and extreme heat. These were overcome through adaptive measures like varied fencing, careful sapling management, bio-fertilizer use, and mulching with local Palmyra waste. Continuous monitoring and community-based problem-solving strengthened resilience and improved restoration outcomes.

Small Grants Programme (India)

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